

# Scattering dynamics of dust in the interstellar medium

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In recent works [1,2], we have presented a full solution to the scattering problem of non-spherical particles and the corresponding dynamical problem in a numerically exact manner. The solution provides a means of studying how cosmic dust particles spin under radiative torques. In this work, we extend the previously developed dynamical integrator to take into account some dynamical effects affecting interstellar dust particles.

Several effects affecting the alignment of interstellar dust have been identified and studied [3]. In this work, we evaluate some previously applied approximations about the dynamics of spinning dust particles and the limits of the precise dynamical integration under the extreme time scale differences between scattering and magnetic field coupling effects. From this analysis, a new integration scheme is implemented and presented.

The resulting integration scheme has two parts. First, the plane of most stable spinning is identified by explicit integration methods. Second, the alignment is studied by combining the results of the first integration with the gradually aligning larger-time-scale effects. The dynamics and alignment of an ensemble of Gaussian random ellipsoids [4] modeling interstellar dust and resulting polarization are presented.

## References

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